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CC

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/637,608  
Applicant : FLYNN, ET AL.  
Filed : AUGUST 11, 2003  
Title : HYDROGEN ODORANTS AND ODORANT SELECTION METHOD

Art Unit : 1754  
Examiner : LANGEL, WAYNE A.

Atty Docket No. : ENER-0001-UT1

Mail Stop: Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

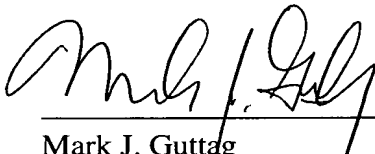
Sir:

The below-identified communication(s) is (are) submitted in the above-captioned application or proceeding:

- ☒ Appeal Brief
- ☒ Fee Transmittal and Authorization to Charge Deposit Account
- ☒ Credit Card Payment Form

- ☒ The Commissioner is hereby authorized to charge payment of any fees associated with this communication, including fees under 37 C.F.R. §§ 1.16 and 1.17 or credit any overpayment to **Deposit Account Number 10-0233-ENER-0001-UT1.**

Respectfully submitted,

  
\_\_\_\_\_  
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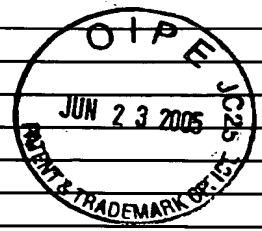
June 23, 2005

# Patent Fee Transmittal for FY 2005

☒ Applicant Claims Small Entity Status 37 C.F.R. 1.27

**TOTAL AMOUNT OF PAYMENT \$250.00**

Application Number 10/637,608  
Filing Date 11-Aug-03  
Named Inventor FLYNN, et al.  
Examiner Name LANGE, Wayne A.  
Art Unit 1754  
Attorney Docket No. ENER-0001-UT1



## FEE CALCULATION

### 1. Filing Fees

Application Type	Description	Large Entity		Small Entity		Paid
		Code	(\$)	Code	(\$)	
Utility	Basic	1011	300	2011	150	\$ -
	Examination	1311	200	2311	100	\$ -
	Search	1111	500	2111	250	\$ -
Design	Basic	1012	200	2012	100	\$ -
	Examination	1312	130	2312	65	\$ -
	Search	1112	100	2112	50	\$ -
Plant	Basic	1013	200	2013	100	\$ -
	Examination	1313	160	2313	80	\$ -
	Search	1113	300	2113	150	\$ -
Reissue	Basic	1014	300	2014	150	\$ -
	Examination	1114	600	2114	300	\$ -
	Search	1314	500	2314	250	\$ -
Provisional	Basic	1005	200	2005	100	\$ -
National Stage	Basic	1631	300	2631	150	\$ -
	Examination	1633	200	2633	100	\$ -
	Search	1632	500	2632	250	\$ -

### 2. Extra Claim Fee

#### a. Claims as Filed

		Large Entity		Small Entity		Paid
		Code	(\$)	Code	(\$)	
Total Claims	0 - 20 = 0	1201	50	2201	25	\$ -
Independent	0 - 3 = 0	1202	200	2202	100	\$ -
Multiple Dependent		1203	360	2203	180	\$ -

#### b. Claims as Amended

		Large Entity		Small Entity		Paid
		Code	(\$)	Code	(\$)	
Total Claims	0 - 0 = 0	1201	50	2201	25	\$ -
Independent	0 - 0 = 0	1202	200	2202	100	\$ -
First Presentation of Multiple Dependent		1203	360	2203	180	\$ -

\* Less than 20, enter 20 \*\* Less than 3, enter 3

### 3. Extra Page Fee

		Large Entity		Small Entity		Paid
		Code	(\$)	Code	(\$)	
Total Pages	0 - 100 = 0	1081	250	2081	125	\$ -
Extra Pages	0					

#### Subtotal for Application Fees

1 \$ - + 2 \$ - + 3 \$ - = \$ -

### 4. Additional Fees

Description	Large Entity		Small Entity		Paid
	Code	(\$)	Code	(\$)	
Extension for response first month	1251	120	2251	60	\$ -
Extension for response second month	1252	450	2252	225	\$ -
Extension for response third month	1253	1,020	2253	510	\$ -
Extension for response fourth month	1254	1,590	2254	795	\$ -
Extension for response fifth month	1255	2,160	2255	1,080	\$ -
Notice of Appeal	1401	500	2401	250	\$ -
Filing a Brief in Support of an Appeal	1402	500	2402	250	\$ 250
Request for Oral hearing	1403	1,000	2403	500	\$ -
Petitions under 1.17(f)	1462	400	1462	400	\$ -
Petitions under 1.17(g)	1463	200	1463	200	\$ -
Petitions under 1.17(h)	1464	130	1464	130	\$ -
Petition - public use proceeding	1451	1,510	1451	1,510	\$ -
Petition to Revive - Unavoidable	1452	500	2452	250	\$ -
Petition to Revive - Unintentional	1453	1,500	2453	750	\$ -
Utility Issue Fee	1501	1,400	2501	700	\$ -
Design Issue Fee	1502	800	2502	400	\$ -
Plant Issue Fee	1503	1,100	2503	550	\$ -
Reissue Issue Fee	1511	1,400	2511	700	\$ -
Publication Fee	1504	300	1504	300	\$ -
Statutory Disclaimer	1814	130	2814	65	\$ -

(cont.)

Description (cont.)	Large Entity		Small Entity		Paid
	Code	(\$)	Code	(\$)	
Recording each Assignment	8021	40	8021	40	\$ -
Submission of IDS	1806	180	1806	180	\$ -
Request for Cont. Examination (RCE)	1801	790	2801	395	\$ -
Filing Submission After Final	1809	790	2809	395	\$ -
Surcharge - late filing fee or oath	1051	130	2051	65	\$ -
Surcharge - late provisional fee	1052	50	2052	25	\$ -
Non-English Specification	1053	130	1053	130	\$ -
Processing Fee 37 CFR 1.17(q)	1807	50	1807	50	\$ -
Request for Ex Parte Reexamination	1812	2,520	1812	2,520	\$ -
Request Pub. of SIR prior to action	1804	920	1804	920	\$ -
Request Pub. of SIR after action	1805	1,840	1805	1,840	\$ -
Each Add. Invention Examined	1810	790	2810	395	\$ -
Expedited Examination (Design)	1802	900	1802	900	\$ -
Unintentionally Delayed Priority Claim	1453	1,370	1453	1,370	\$ -
Certificate of Correction	1811	100	1811	100	\$ -
Maintenance Fees 3.5 years	1551	900	2551	450	\$ -
Maintenance Fees 7.5 years	1552	2,300	2552	1,150	\$ -
Maintenance Fees 11.5 years	1553	3,800	2553	1,900	\$ -
Surcharge - Late Payment 6 mos.	1554	130	2554	65	\$ -
Other fee					\$ -

Additional Fee Subtotal \$ 250

### METHOD OF PAYMENT (Check all that apply)

☒ Credit Card (Provide credit card information and authorization on PTO-2038)

☒ Deposit Account No. 10-0233-ENER-0001-UT1

For the above-identified deposit account, the Director is hereby authorized to:

- ☐ To charge the above-identified fee.  
☒ To charge any additional fees which may be required under 37 CFR 1.16, 1.17, 1.18, 1.20 and 1.492 or credit any overpayment to the deposit account number listed above.

Submitted by:

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Signature

June 23, 2005

Date



**THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application No. : 10/637,608  
Appellant/Applicant : FLYNN ET AL.  
Filed : AUGUST 11, 2003  
Title : HYDROGEN ODORANTS AND ODORANT SELECTION METHOD

Art Unit : 1754  
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**APPELLANTS BRIEF**

Sir:

This is an appeal of claims 2-4, 7-11 and 45-53 currently pending in the present application that were rejected by the Examiner in an Office Action (made FINAL) dated February 17, 2005. A timely Notice of Appeal was submitted by Appellants to the Patent and Trademark Office on May 16, 2005. Appellants Brief is being timely submitted herewith in support of their appeal to the Board of Appeals and Patent Interferences (Board), together with the requisite fee of \$250.00.

**REAL PARTY IN INTEREST**

The real party in interest is Enersol, Inc., the assignee of the present application.

**RELATED APPEALS AND INTERFERENCES**

There are currently no appeals or interferences known to Appellants, Appellants' legal representative, or the assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

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***Serial Number: 10/637,608***

#### **STATUS OF CLAIMS**

Claims 2-4, 7-11 and 45-53 are currently pending and are the only rejected claims on appeal. A clean copy of Claims 2-4, 7-11 and 45-53 on appeal appears in the attached Claims Appendix.

#### **STATUS OF AMENDMENTS**

No amendments have been filed since the Final Action of February 17, 2005.

#### **SUMMARY OF THE INVENTION**

Appellants claimed invention relates to a hydrogen composition comprising: hydrogen and an odorant that is a selenium compound. The selenium odorant has a vapor pressure greater than 0.5 psi, has a smell detectable at less than 1 ppm by a human nose, and is in a vapor phase at a detectable concentration at a pressure of 6000 psi (See Claim 2, and the specification at paragraphs [0010] and [0066]\*). Embodiments of Appellants claimed invention include:

1. A hydrogen composition consisting essentially of hydrogen gas and the selenium odorant (See Claim 7, and the specification at paragraphs [0010] and [0066]).
2. The selenium odorant being from 0.01 to 1000 ppm of the composition (see Claim 8) with the odorant comprising 0.1 to 40 ppm of the composition (see Claim 9).
3. The selenium odorant not being harmful to humans (see Claim 10).

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\*For convenience, all paragraph references in the present Appeal Brief are to the version published as United States Published Patent Application No. 20040031314.

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4. A hydrogen composition, wherein the selenium odorant has a minimum olfactory power of 7.0, a minimum vapor pressure of 0.5 psi at standard temperature and pressure, a minimum diffusivity of  $0.01147 \text{ cm}^2/\text{s}$ , and a maximum molecular weight of 200 g/mol (see Claim 11).

5. A fuel cell containing the hydrogen composition described above (see Claim 45 and the specification at paragraphs [0054] and [0056]) and that the fuel cell may be a vehicle fuel cell (see Claim 46, and the specification at paragraphs [0054], [0055] and [0092]).

6. The selenium compound may be specifically: ethylselenol (see Claim 3), dimethyl selenide (see Claim 4), methylselenol (see Claim 47), isopropylselenol (See Claim 48), propylselenol (see Claim 49), ethylmethylselenide (see claim 50), isopropylmethylselenide (see Claim 51), tertbutylselenol (see Claim 52), or diethylselenide (see Claim 53). See also Table 11 of paragraph [0129] of the specification.

#### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

There are two grounds of rejection to be reviewed on this appeal:

A. The first ground of rejection is whether Claims 2-4, 7-11 and 47-53 are unpatentable under 35 U.S.C. § 103(a) over French Patent No. 2,645,622 (French '622); and

B. The second ground of rejection is whether Claims 45 and 46 are unpatentable under 35 U.S.C. § 103(a) over French '622 in view of Appellants' allegedly admitted prior art in paragraphs [0005] and [0006] of the present patent application.

**ARGUMENT**

**A. REJECTION OF CLAIMS 2-4, 7-11 AND 45-53 AS UNPATENTABLE UNDER 35 U.S.C. § 103(A) OVER FRENCH '622.**

In rejecting Claims 2-4, 7-11 and 45-53 as unpatentable under 35 U.S.C. § 103(a) over French '622, the Examiner has erred for at least five reasons: (1) the rejection of Claims 2-4, 7-11 and 45-53 over French '622 is now improper and should be withdrawn because the Examiner failed to timely respond to Appellants' proper request for an Affidavit/Declaration under 37 C.F.R. § 1.104(d)(2); (2) the Examiner has admitted that the selenium compounds of the claimed composition of Claims 2-4, 7-11 and 45-53 are patentably distinct over the sulfur compounds described in French '622, thus making the claimed composition comprising these patentably distinct selenium compounds with hydrogen implicitly unobvious over French '622; (3) the rejection of Claims 2-4, 7-11 and 45-53 over French '622 is based on an improper "obvious to try" standard; (4) the rejection of Claims 2-4, 7-11 and 45-53 is *prima facie* improper because the Examiner has failed to cite any reference teaching or suggesting the use of selenium compounds for any purpose; and (5) the rejection Claims 3-4, 8, 9, 11 and 45-53 is *prima facie* improper because the Examiner has failed to cite any reference or combination of references that teaches or suggests the various features of these Claims.

- 1. The rejection of Claims 2-4, 7-11 and 45-53 over French '622 is now improper and should be withdrawn because the Examiner failed to timely respond to Appellants' proper request for an Affidavit/Declaration under 37 C.F.R. § 1.104(d)(2).**

At page 10 of Appellants' January 21, 2005 Amendment, Appellants pointed out that the rejection of Claims 2-4 over French '622 was based on facts within the personal knowledge of the Examiner. Appellants therefore properly requested under 37 C.F.R. § 1.104(d)(2) that the Examiner provide an affidavit or declaration supporting the

Examiner's assertion based on his personal knowledge and used as a basis for rejecting Claims 2-4.

In the Final Action that responded to this January 21, 2005 Amendment, the Examiner nonetheless failed to provide the properly requested affidavit/declaration under 37 C.F.R. § 1.104(d)(2). In addition, during a subsequent Telephone Interview with the Examiner on March 28, 2005 (Examiner Interview), Appellants' counsel pointed out to the Examiner that he had failed to respond to Appellants' request for an affidavit/declaration under 37 C.F.R. § 1.104(d)(2). In response, the Examiner stated he did not think he had to abide by the requirements of 37 C.F.R. § 1.104(d)(2).

The Examiner's belief that he can ignore the requirements of 37 C.F.R. § 1.104(d)(2) in response to a proper request by Appellants is erroneous. Appellants are aware of no law or rule that permits an Examiner to ignore the requirements of 37 C.F.R. § 1.104(d)(2). Instead, the Examiner's failure to *timely* provide the requested affidavit/declaration is a clear violation of 37 C.F.R. § 1.104(d)(2), and thus requires the rejection of Claims 2-4 to be withdrawn immediately. Because the rejection of Claims 2-4 based on French '622 is the only rejection currently pending against Claims 2-4, these Claims should therefore be in condition for allowance. Additionally, because Claims 7-11 and 45-53 depend from Claim 2, either directly or indirectly, Claims 7-12 and 45-53 should also be in condition for allowance.

- 2. The Examiner has admitted that the selenium compounds of the claimed composition of Claims 2-4, 7-11 and 45-53 are patentably distinct over the sulfur compounds described in French '622, thus making the claimed composition comprising these patentably distinct compounds with hydrogen implicitly unobvious over French '622.**

Claim 2 relates to a composition comprising hydrogen and a *selenium compound* as an odorant. By contrast, French '622 does not teach or suggest the use of a selenium compound. In fact, French '622 only describes the use of mercaptan,

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thiophane and TBM (tertiary butyl mercaptan)<sup>1</sup> odorants, all of which are *sulfur*, not selenium, compounds. Furthermore, as admitted by the Examiner at page 4 of his July 24, 2004 Restriction Requirement (Restriction Requirement) and in the Final Action at page 2, selenium compounds are a “patentably distinct” species from sulfur compounds. Because the Examiner has previously admitted and continues to admit that selenium compounds are *patentably distinct* from sulfur compounds, the composition of Claim 2 comprising these patentably distinct selenium compounds are implicitly unobvious over French ‘622.

In addition, French ‘622 itself suggests that the use of non-sulfur compounds, including selenium compounds, as an odorant is patentably distinct from the use of sulfur compounds as an odorant. French ‘622 only mentions the use of sulfur compounds as odorants, without ever mentioning the possibility of using non-sulfur compounds as odorants. Contrary to what the Examiner asserts at page 2 of the Office Action, French ‘622 cannot and does not suggest that compounds other than sulfur, much less selenium compounds, may be used as odorants with hydrogen.

Although the Examiner has previously determined in the Restriction Requirement that the selenium compounds of Claim 2 are patentably distinct from sulfur compounds, the Examiner backtracks in the Final Action by arguing that these same selenium compounds are suggested by French ‘622 that discloses only sulfur compounds. This backtracking by the Examiner requires an improper reliance on Appellants’ own disclosure in the present application, and is also at least implicitly contrary to the Manual of Patent Examining Procedure (MPEP) at § 803. The Federal Circuit has stated in *Cardiac Pacemakers Inc. v. St Jude Medical Inc.* 72 USPQ2d 1333, 1336 (Fed. Cir 2004) that “Prior knowledge in the field of the invention must be supported by tangible teachings of reference materials, and the suggestion to combine references must not be derived by hindsight from knowledge of the invention itself. See also *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1578-79 [42 USPQ2d 1378] (Fed. Cir. 1997) (“However, the record must provide a teaching,

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<sup>1</sup> See U.S. Patent No. 5,247,971, copy attached at the end of this Brief as an authority.

suggestion, or reason to substitute computer-controlled valves for the system of hoses in the prior art. The absence of such a suggestion to combine is dispositive in an obviousness determination.”)”) Except for Appellants’ disclosure in their own application, the Examiner has cited no reference that teaches or suggests the use of selenium compounds for any purpose, much less for use as an odorant or for use as an odorant with hydrogen.

Accordingly, the rejection of Claim 2 based on French ‘622 is improper as being implicitly based on Appellants’ own disclosure. In addition, because Claims 3-4, 7-11 and 45-53 depend from Claim 2, either directly or indirectly, the rejection of these other Claims are also improper for at least the same reasons discussed above with respect to Claim 2.

**3. The rejection of Claims 2-4, 7-11 and 45-53 over French ‘622 is based on an improper “obvious to try” standard.**

The only criteria that the Examiner has provided for choosing other odorants in place of the sulfur odorants described in French ‘622 is the following test: “one of ordinary skill in the art could determine which gaseous compounds are odorous by smelling them” (See Final Action, p. 3-4). In other words, the Office Action argues that it would be “obvious to try” to substitute the selenium compounds of Claims 2-4, 7-11 and 45-53 for the sulfur compounds of French ‘622.

As the Federal Circuit has repeatedly stated and held, “obvious to try” is not the standard to be applied under 35 U.S.C. § 103. See, e.g., *In re Deuel*, 34 USPQ2d 1210, 1216 (Fed. Cir. 1995): “‘Obvious to try’ has long been held not to constitute obviousness. *In re O’Farrell*, 853 F.2d 894, 903, 7 USPQ2d 1673, 1680-81 (Fed. Cir. 1988).” While the Examiner argues in the Final Action that he is not using an “obvious to try” standard, the only reasonable conclusion that the Board can reach is that Examiner’s “test” for obviousness is based on an improper “obvious to try” standard. Although the Appellants have not canvassed all of the natural, as well as synthetic odorants, Appellants can reasonably suggest there may be hundreds of thousands, if not

millions of odorous compounds that a person of ordinary skill in the art might have to randomly smell before encountering any selenium compound of the claimed compositions, much less the particular selenium compounds of Claims 3-4 and 47-53.

Using the Examiner's criteria of what is "odorous," and in the process of randomly sampling this multitudinous number of gaseous compounds to determine which are odorous, the Examiner's person of ordinary skill in the art is likely to consider the following compounds to be suggested by French '622: (a) hydrocyanic acid which smells like bitter almonds;<sup>2</sup> (b) *bis*(2-chloroethyl)sulfide which has a sweet, agreeable odor;<sup>3</sup> and (3) phosgene which has the odor of moldy hay.<sup>4</sup> Hydrocyanic acid was made infamous as Zyklon B used in the gas chambers of Auschwitz. *Bis*(2-chloroethyl)sulfide (better known as "mustard gas"), and phosgene were both used as toxic chemical weapons in the First World War. Based on these three toxic compounds alone, including one sulfur compound (mustard gas), that meet the Examiner's criteria of being "odorous," the suggestion that French '622 would lead a person of ordinary skill in the art to use any and all odorous compounds in place of the sulfur compounds of French '622 is absurd. In fact, given the toxicity of mustard gas, a well-known sulfur compound, French '622 would not be considered by one of ordinary skill in the art to even suggest that any and all sulfur compounds could be used in place of the sulfur compounds of French '622.

The Examiner's alleged basis for French '622 suggesting all of the compositions of Claims 2-4, 7-11 and 45-53 leaves it to the Board's speculation as to how a person of ordinary skill in the art could determine *by smell alone* that: an odorant comprises 0.01 to 1000 ppm of a composition (Claim 8); an odorant comprises 0.1 to 40 ppm of a composition (Claim 9); an odorant is harmful to humans (Claim 10); an odorant having a minimum olfactory power of 7.0, a minimum vapor pressure of 0.5 psi at standard temperature and pressure, a minimum diffusivity of 0.01147 cm<sup>2</sup>/s, and a maximum

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<sup>2</sup> See Sax et al., *Hawley's Condensed Chemical Dictionary*, 11<sup>th</sup> Ed. (1987), p. 615, copy attached at the end of this Brief as an authority.

<sup>3</sup> See Merck Index, 8<sup>th</sup> Ed. (1968), p. 706, copy attached at the end of this Brief as an authority.

<sup>4</sup> See Merck Index, 8<sup>th</sup> Ed. (1968), p. 823, copy attached at the end of this Brief as an authority.

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molecular weight of 200 g/mol (Claim 11); an odorant for use in a fuel cell (Claim 45); or an odorant suitable for use in a vehicle fuel cell (Claim 46).

Accordingly, the rejection of Claims 2-4, 7-11 and 45-53 over French '622 is also grounded on an improper "obvious to try" standard.

- 4. The rejection Claims 2-4, 7-11 and 45-53 is *prima facie* improper because the Examiner has failed to cite any reference teaching or suggesting the use of selenium compounds for any purpose.**

Claims 2-4, 7-11 and 45-53 relate to a composition comprising hydrogen and a selenium compound as an odorant. However, French '622 does not teach or suggest the use of a selenium compound. In fact, from the English Abstract, French '622 only describes the use of mercaptan and thiophane odorants which are both sulfur compounds. In addition, the Office Action cites no reference showing that selenium compounds may be used for any purpose, much less as a substitute for the sulfur compounds of French '622 as an odorant. As stated in the Manual of Patent Examining Procedure (MPEP) at § 706.02(j) "To establish a *prima facie* case of obviousness, . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations." Because the Examiner has cited no reference that teaches or suggests the use of a selenium compound as an odorant, a feature of Claims 2-4, 7-11 and 45-53, the rejection of these Claims 2-4, 7-11 and 45-53 under 35 U.S.C. § 103(a) as being unpatentable is *prima facie* improper.

- 5. The rejection Claims 3-4, 8, 9, 11 and 45-53 is *prima facie* improper because the Examiner has failed to cite any reference or combination of references that teaches or suggests the various features of Claims 3-4, 8, 9, 11 and 45-53.**

Various features of Claims 3-4, 8, 9, 11 and 45-53 are totally unaddressed by the Examiner's rejection in the Final Office Action. For example, Appellants have

discussed above the Examiner's failure to cite any reference that mentions the use of selenium compounds. In addition, the Examiner has failed to cite any reference that teaches or suggests: (a) an odorant comprising 0.01 to 1000 ppm of the composition according to Claim 8; (b) an odorant comprising 0.1 to 40 ppm of the composition according to Claim 9; or (c) an odorant having a minimum olfactory power of 7.0, a minimum vapor pressure of 0.5 psi at standard temperature and pressure, a minimum diffusivity of 0.01147 cm<sup>2</sup>/s, and a maximum molecular weight of 200 g/mol according to Claim 11.

The Examiner has also not cited any reference that describes the use of the following claimed compounds for any purpose, much less as an odorant: (a) ethylselenol (Claim 3); (b) dimethyl selenide (Claim 4); (c) methylselenol (Claim 47); (d) isopropylselenol (Claim 48); (e) propylselenol (Claim 49); (f) ethylmethylselenide (Claim 50); (g) isopropylmethylselenide (Claim 51); (h) tertbutylselenol (Claim 52) and (i) diethylselenide (Claim 53).

As previously mentioned, the Manual of Patent Examining Procedure (MPEP) at § 706.02(j) states, "To establish a *prima facie* case of obviousness, . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations." Because the Examiner has cited no reference that teaches or suggests the above various features of Claims 3-4, 8, 9, 11 and 45-53, the rejection of these Claims under 35 U.S.C. § 103(a) as being unpatentable is also *prima facie* improper.

**B. REJECTION OF CLAIMS 45 AND 46 AS UNPATENTABLE UNDER 35 U.S.C. § 103(A) OVER FRENCH '622, IN VIEW OF ALLEGED ADMITTED PRIOR ART**

In rejecting Claims 45 and 46 as unpatentable under 35 U.S.C. § 103(a) over French '622 in view of the allegedly admitted prior art in paragraphs [0005] and [0006] of the present application, the Examiner has erred for at least the following reason: the Examiner has failed to provide any proper motivation for combining French '622 with this allegedly admitted prior art.

French '622 states that it is directed to a "method for dispensing industrial

hydrogen, in particular for heat treatment of annealed metals, of the type in which a hydrogen store is used, in particular in liquid form, at the place of use, which is vaporized on demand, the said hydrogen being conveyed by a pipeline to the installation.” There is no suggestion in French ‘622 of any use of hydrogen that is related to its use in fuel cells, as described in the present application at paragraphs [0005] and [0006].

As also noted in the present application, the use of an odorant in a fuel cell requires that the odorant meet particular requirements that are specific to its use in a fuel cell. For example, paragraph [0056] of the present application states, “Any odorant chosen for hydrogen should not poison the storage material, nor should the odorant inhibit fuel cell performance or poison the fuel cell catalyst.” There is no indication at all in French ‘622 of any concern about choosing an odorant based on its potential deleterious effects on the performance of a fuel cell or a fuel cell catalyst. As stated by the Federal Circuit in *Sibia Neurosciences Inc. v. Cadus Pharmaceutical Corp.*, 55 USPQ2d 1927, 1931 (Fed. Cir. 2000), “[d]etermining whether there is a suggestion or motivation to modify a prior art reference is one aspect of determining the scope and content of the prior art, a fact question subsidiary to the ultimate conclusion of obviousness.” (citing *Tec Air, Inc. v. Denso Mfg.*, 52 USPQ2d 1296, 1297-98 (Fed. Cir. 1999) (stating that the factual underpinnings of obviousness include whether a reference provides a motivation to combine its teachings with another). Furthermore, as noted by the Federal Circuit in *In re Lee*, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002), specific reasons must be shown in the art suggesting a combination of references. See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) (“[P]articular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.”); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) (“[E]ven when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination.”).

In fact, the only motivation for combining this allegedly admitted prior art

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with French '622 appears to be improperly based on Appellants' own description of their claimed invention in the present application. As stated in *In re Lee* at 1434, "It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher. *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983)." The Examiner has cited no portion of French '622 that would provide a person of ordinary skill in the art with any motivation to combine the teachings of French '622 with the teachings of the alleged prior art mentioned in Appellants' application at paragraphs [0005] and [0006]. The only conclusion the Board can thus reach is that Examiner has improperly relied on Appellants' own disclosure of their claimed invention in the present application as the sole motivation for combining the allegedly admitted prior art with French '622. Accordingly, this rejection of Claims 45 and 46 is *prima facie* improper.

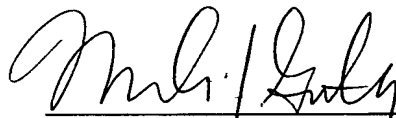
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**SUMMARY OF ARGUMENT AND RELIEF REQUESTED**

For the reasons discussed above, the rejection of Claims 2-4, 7-11 and 47-53 under 35 U.S.C. § 103(a) based on French '622 is *prima facie* improper and should be withdrawn. Also, for the reasons discussed above, the rejection of claims 45 and 46 under 35 U.S.C. § 103(a) based on a combination of the allegedly admitted prior art and French '622 is *prima facie* improper and should be withdrawn.

Accordingly, Appellants respectfully request the Honorable Board of Appeals and Interferences to reverse the Examiner's rejections of Claims 2-4, 7-11, and 45-53 and remand with directions to allow the present application to issue with currently pending Claims 2-4, 7-11, and 45-53.

Respectfully submitted,



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June 23, 2005

Grade: USP.

Use: Medicine (anti-inflammatory agent), also used as the acetate and sodium succinate salts. See also cortisone.

**hydrocracking.** The cracking of petroleum or its products in the presence of hydrogen. Special catalysts are used, for example, platinum on a solid base of mixed silica and alumina or zinc chloride.

See also hydrogenation, hydrogenolysis, hydroforming.

**hydrocyanic acid.** (prussic acid; hydrogen cyanide; formonitrile). CAS: 74-90-8. HCN.

Properties: Water-white liquid at temperatures below 26.5°C; faint odor of bitter almonds; usual commercial material is 96–99% pure; d (liquid) 0.688 (20/4°C), (gas) 0.938 g/L, bp 25.6°C; fp –13.3°C; flash p 0F (–17.7°C); soluble in water. The solution is weakly acidic, sensitive to light. When not absolutely pure or stabilized, hydrogen cyanide polymerizes spontaneously with explosive violence. Miscible with water, alcohol, soluble in ether, autoign temperature 1000F (537°C). Derivation: (a) By catalytically reacting ammonia and air with methane or natural gas. (b) By recovery from coke oven gases. (c) From bituminous coal and ammonia at 1250°C. Hydrogen cyanide occurs naturally in some plants (almond, oleander).

Grade: Technical (96–98%), 2, 5, and 10% solutions. All grades usually contain a stabilizer, usually 0.05% phosphoric acid.

Hazard: Flammable, dangerous fire risk, explosive limits in air 6–41%. Toxic by ingestion inhalation, and skin absorption. TLV: 10 ppm in air. Use: Manufacture of acrylonitrile, acrylates, adiponitrile, cyanide salts, dyes, chelates, rodenticides, pesticides.

**hydrodealkylation.** (HDA). A type of hydrogenation used in petroleum refining in which heat and pressure in the presence of hydrogen are used to remove methyl or larger alkyl groups from hydrocarbon molecules, or to change the position of such groups. The process is used to upgrade products of low value, such as heavy reformate fractions, naphthenic crudes, or recycle stocks from catalytic cracking. Also toluene and pyrolysis gasoline are converted to benzene and methyl naphthalenes to naphthalene by this process. See also transalkylation.

**hydrodistillation.** (steam distillation). Removal of essential oils from plant components (flowers, leaves, bark, etc.) by the use of high-temperature steam. The process is used chiefly in the perfume and fragrance industry.

**hydrofining.** A petroleum refining process in which a limited amount of hydrogenation converts the sulfur and nitrogen in a petroleum fraction to forms in which they can be easily removed. Hydrofining is generally a separate treatment prior to more extensive hydrogenation. The usual catalysts are oxides of cobalt and molybdenum. Desulfurization, ultrafining, and catfining have a similar meaning.

**hydroflumethiazide.** (trifluoromethylhydrothiazide). CAS: 135-09-1.

$C_6H_6F_3N_3O_4S_2$ .

Properties: White, crystalline, odorless solid. Mp 260–275°C, insoluble in water and acid, soluble in dilute alkali but unstable in alkaline solutions. Grade: NF.

Use: Medicine (antihypertensive).

**hydrofluoric acid.** CAS: 7664-39-3.

Hydrogen fluoride in aqueous solution.

Properties: Colorless, fuming, mobile liquid; bp (38% solution) 112°C. Will attack glass and any silicon-containing material.

Derivation: Dissolving hydrogen fluoride in water to various concentrations.

Grade: CP, technical, 38%, 47%, 53%, 70%.

Hazard: Toxic by ingestion and inhalation, highly corrosive to skin and mucous membranes. TLV: ceiling 3 ppm.

Use: Aluminum production, fluorocarbons, pickling stainless steel, etching glass, acidizing oil wells, fluorides, gasoline production (alkylation), processing uranium.

See also hydrogen fluoride.

**hydrofluorosilicic acid.** Legal label name (Rail) for fluosilicic acid.

**hydrofluosilicic acid.** See fluosilicic acid.

**hydroforming.** The use of hydrogen in the presence of heat, pressure, and catalysts (usually platinum) to convert olefinic hydrocarbons to branched chain paraffins (isomerization) to yield high-octane gasoline. Catforming and similar terms are often used in the same sense.

**hydrofuranamide.** (furfuramide).

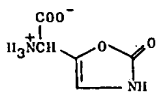
CAS: 494-47-3.  $OC_4H_3CH(NCHC_4H_3O)_2$ .

Properties: Light brown to white powder, mp 117°C, boils about 250°C with decomposition, insoluble in cold water, soluble in alcohol and ether.

Derivation: Treatment of furfural with ammonia.

Use: Rubber accelerator, hardening agent for resins, rodenticides, fungicides.

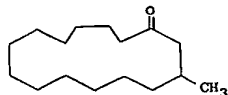
**hydrogasification.** Production of gaseous or liquid fuels by direct addition of hydrogen to coal. See also gasification.



Crystals, dec above 190°. Absorption max at pH 2-7: 212 mμ (ε 8700); at pH 12: 220 mμ (ε 7500).

Human Toxicity: See Muscarine.

**Muscone.** 3-Methylcyclopentadecanone; muskone. C<sub>15</sub>H<sub>30</sub>O; mol wt 238.40. C 80.60%, H 12.68%, O 6.71%. The odorous principle of musk: Ruzicka, *Helv. Chim. Acta* 9, 715 (1926). Structure: Ruzicka, *ibid.* 9, 1008 (1926). Synthesis: Ziegler, Weber, *Ann.* 512, 164 (1934); Ruzicka, Stoll, *Helv. Chim. Acta* 17, 1308 (1934); Hunsdiecker, *Ber.* 75B, 1197 (1942); Stoll, Rouve, *Helv. Chim. Acta* 30, 2019 (1947); Stoll, Commarmont, *ibid.* 31, 554 (1948); Blomquist *et al.*, *J. Am. Chem. Soc.* 70, 34 (1948). Prep of (+)- and (-)-forms: Stållberg-Stenhagen, *Arkiv. Kemi* 3, 517 (1951).



(-)-Form: Oily liq. Musk odor. bp 328°; bpo.s 130°. d<sub>4</sub><sup>25</sup> 0.9221. n<sub>D</sub><sup>25</sup> 1.4802. [α]<sub>D</sub><sup>25</sup> -13°. Very slightly sol in water; miscible with alc.

Semicarbazone, C<sub>17</sub>H<sub>33</sub>N<sub>3</sub>O, plates from methanol, mp 132.4-132.9.

**Muscovite.** K<sub>2</sub>O.3Al<sub>2</sub>O<sub>3</sub>.6SiO<sub>2</sub>.2H<sub>2</sub>O—potassium aluminum silicate dihydrate.

**Musk.** Dried secretion from the preputial follicles of *Moschus moschiferus* L., *Moschidae*. *Habit.* Northern Asia, Tonquin Tibet. *Constit.* Odorous substance—muskone; cholesterol, fat, wax and albumins.

USE: In perfumery.

**Mustard, Black.** Brown or red mustard. Dried ripe seeds of *Brassica nigra* (L.) Koch, or of *B. juncea* (L.) Cosson, and of varieties of these species (*Cruciferae*). *Habit.* Europe, Asia, naturalized in U.S. *Constit.* Sinigrin (potassium myronate), myrosin, sinapine sulfocyanate, fixed oil; erucic, behenic, and sinapolic acids.

USE: Source of volatile oil of mustard.

MED USE: Extern. as counterirritant, intern. as emetic.

VET USE: Counterirritant. Intern. carminative for large animals; emetic for dogs. *Dose:* horses and cattle: carminative and stomachic: 8-15 g; dogs: emetic: 4-15 g in warm water.

**Mustard Gas.** *Bis(2-chloroethyl)sulfide*; β,β'-dichloroethyl sulfide; 2,2'-dichlorodithiyl sulfide; bis(β-chloroethyl)-sulfide; 1-chloro-2-(β-chloroethylthio)ethane; Yperite; sulfur mustard; yellow cross liquid; Kampfstoff "Lost." C<sub>4</sub>H<sub>8</sub>Cl<sub>2</sub>S; mol wt 159.08. (ClCH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>S; C 30.20%, H 5.07%, Cl 44.58%, S 20.16%. Prep'd by treating ethylene with sulfur chloride (Levinstein process): Mann, Pope, *J. Chem. Soc.* 121, 594 (1922); by treating β,β'-dihydroxyethyl sulfide with HCl gas (German process): Meyer, *Ber.* 19, 3260 (1886); *Ann.* 240, 310 (1887); Gomberg, *J. Am. Chem. Soc.* 41, 1427 (1919). Reactions and derivatives: Helfrich, Reid, *ibid.* 42, 1208 (1920).

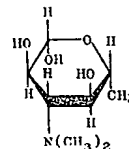
Oily liquid. *Deadly vesicant. War gas. Quickly causes conjunctivitis and blindness.* Weak, sweet, agreeable odor. On cooling it forms prisms, mp 13-14°. d<sub>4</sub><sup>25</sup> 1.338 (solid); d<sub>4</sub><sup>20</sup> 1.2741 (liq). bp<sub>760</sub> 215-217°; bp<sub>10</sub> 98°. Volatile with steam. n<sub>D</sub><sup>20</sup> 1.53125. Very sparingly sol in water; sol in fat solvents, other common organic solvents. High lipid soly. Vapor pressure at 0° = 0.025 mm; at 30° = 0.090 mm. Hydrolyzed by alkalis. Recommended neutralizing agent and inactivator: Bleaching powder, sodium hypochlorite. LD<sub>50</sub> i.v. in rats: 0.7 mg/kg. Lethal concn for dogs in air: 1.0 ppm.

*Human Toxicity:* Conjunctivitis, blindness. Produces delayed effects. In 1-12 hrs cough, edema of eyelids, erythema of skin, severe pruritus. May cause edema, ulceration, necrosis of respiratory tract and exposed skin. Ingestion of contaminated material may cause nausea and vomiting. Mortality rate low. Permanent eye damage, severe respiratory impairment may result.

**Mustard, White.** Yellow mustard. Dried ripe seeds of *Brassica alba* (L.) Boiss. (*Sinapis alba* L.), *Cruciferae*. *Habit.* Europe, Asia, adventitious in U.S. *Constit. and Use:* As of mustard, black.

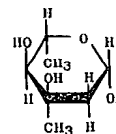
MED and VET USE: See Mustard, Black.

**Mycaminose.** 3,6-Dideoxy-3-(dimethylamino)-D-glucose. C<sub>6</sub>H<sub>17</sub>NO<sub>4</sub>; mol wt 191.22. C 50.25%, H 8.96%, N 7.33%, O 33.47%. Part of the carbomycin molecule. Synthesis and stereochemistry: Richardson, *Proc. Chem. Soc.* 1961, 430; Foster *et al.*, *Chemistry & Industry (London)* 1962, 142. Stereochemistry: Grisebach, Hofheinz, *Angew. Chem.* 74, 499 (1962).



Isolated as the hydrochloride monohydrate. Crystals from moist isopropanol, mp 116-118°. [α]<sub>D</sub><sup>25</sup> +31° (equilibrium value, c = 0.96 in water).

**Mycarose.** 2,6-Dideoxy-3-C-methylhexose; 2,6-dideoxy-3-C-methyl-L-ribo-hexose; 2-(4,5-cis)-trihydroxy-4,6-dimethyltetrahydropyran. C<sub>7</sub>H<sub>14</sub>O<sub>4</sub>; mol wt 162.18. C 51.84%, H 8.70%, O 39.46%. Constituent of the macrolides carbomycin A and B, spiramycin A, B and C and tylosin: Woodward, *Angew. Chem.* 69, 50 (1957); Paul, Tchelitcheff, *Bull. Soc. Chim. France* 1957, 443; 1960, 150; Hamill *et al.*, *Antibiotics and Chemotherapy* 11, 328 (1961). Part of carbomycin molecule: Regna *et al.*, *J. Am. Chem. Soc.* 75, 4625 (1953). Stereochemistry: Grisebach, Hofheinz, *Angew. Chem.* 74, 499 (1962); Foster *et al.*, *Proc. Chem. Soc.* 1962, 254; Hofheinz *et al.*, *Tetrahedron* 18, 1265 (1962). Synthesis of DL-mycarose: Korte *et al.*, *ibid.* 18, 1257 (1962); Grisebach *et al.*, *Ber.* 96, 1823 (1963). Synthesis of L-mycarose: Lemal *et al.*, *Tetrahedron* 18, 1275 (1962). Synthesis of D-mycarose: Flaherty *et al.*, *J. Chem. Soc. Sect. C*, 1966, 398.



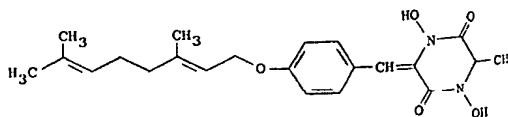
DL-Form: Crystals from acetone + petr ether, mp 110-111°.

L-Form: Needles from boiling acetone + chloroform, mp 128.5-130.5°. [α]<sub>D</sub><sup>25</sup> -31.1° (c = 4). Soluble in water. Exhibits only end absorption in the ultraviolet.

3-O-Methylmycarose, *Cladinose*, C<sub>8</sub>H<sub>16</sub>O<sub>4</sub>. Constituent of erythromycin A and B. Liquid, bpo.<sub>25</sub> at bath temp 120-132°. [α]<sub>D</sub><sup>25</sup> -23.1° (c = 2.6 in water). Exhibits only end absorption in the ultraviolet. Soluble in water, alcohol, acetone, ether, benzene, chloroform, carbon tetrachloride; slightly sol in petr ether. Dec by strong acids.

3,4-Di-O-methylmycarose, C<sub>8</sub>H<sub>18</sub>O<sub>4</sub>, prisms from petr ether, mp 83-86°. [α]<sub>D</sub><sup>25</sup> -20.0° (c = 2.9 in chloroform).

**Mycelianamide.** C<sub>22</sub>H<sub>28</sub>N<sub>2</sub>O<sub>5</sub>; mol wt 400.46. C 65.98%, H 7.05%, N 7.00%, O 19.98%. Antibiotic substance found in the mycelium of *Penicillium griseofulvum*: Anslow, Raistrick, *Biochem. J.* 25, 39 (1931); Oxford *et al.*, *ibid.* 29, 1102 (1935); 33, 240 (1939); Oxford, Raistrick, *ibid.* 42, 323 (1948). Structure: Birch *et al.*, *J. Chem. Soc.* 1956, 3717; Bates, Schauble, *Tetrahedron Letters* 1963, 1683. Configuration: Gallina *et al.*, *Gazz. Chim. Ital.* 94, 1301 (1964).



Consult the cross index before using this section

USE: Systemic insecticide. *Human Toxicity*: Cholinesterase inhibitor. See Parathion.

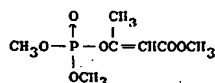
**Phorone**. 2,6-Dimethyl-2,5-heptadien-4-one; diisopropylideneacetone.  $(CH_3)_2C=CHCOCH=C(CH_3)_2$ ; mol wt 138.20.  $C_9H_{14}O$ ; C 78.21%, H 10.21%, O 11.58%. Prepn from isobutyryllithium +  $CO_2$ : Braude, Timmons, *J. Chem. Soc.* 1950, 2000; from acetone: Dolgov, Samsonova, *Zh. Obshchei Khim.* 22, 632 (1952); Joseph, Blumenthal, *J. Org. Chem.* 24, 1371 (1959); Tsmur, *Zh. Priklad. Khim.* 34, 1628 (1961).

Yellow liq or yellowish-green prisms, mp 28°. bp 198–199°; bp<sub>17</sub> 88°.  $d_4^{20}$  0.885.  $n_D^{20}$  1.4968.

2,4-Dinitrophenylhydrazones,  $C_{15}H_{18}N_4O_4$ , red needles from methanol, mp 115–116°.

*Human Toxicity*: No specific data. Vapors of compds of this type generally have narcotic properties.

**Phosdrin®**. 3-Hydroxycrotonic acid methyl ester dimethyl phosphate; 1-methoxycarbonyl-1-propen-2-yl dimethyl phosphate; methyl 3-(dimethoxyphosphinyloxy)crotonate; *O,O*-dimethyl 1-carbomethoxy-1-propen-2-yl phosphate; 2-carbomethoxy-1-methylvinyl dimethyl phosphate; OS-2046.  $C_7H_{13}O_6P$ ; mol wt 224.16. C 37.51%, H 5.84%, O 42.83%, P 13.82%. Prepn: A. R. Stiles, U.S. pat. 2,685,552 (1954 to Shell Dev. Co.). Configuration of isomers: Fukuto *et al.*, *J. Org. Chem.* 26, 4620 (1961).



Commercial product is a yellow liq mixture of *cis*- and *trans*-isomers.  $d_4^{20}$  1.25.  $n_D^{20}$  1.4494. bp<sub>1</sub> 106–107.5°. Miscible with water, acetone, benzene, carbon tetrachloride, chloroform, ethyl and isopropyl alcohols, toluene and xylene. One gram dissolves in 20 ml carbon disulfide and 20 ml kerosene. Practically insol in hexane. LD<sub>50</sub> orally in mice: 9.0 mg/kg; in rats: 4.0 mg/kg.

USE: Systemic insecticide. *Human Toxicity*: Cholinesterase inhibitor. See Parathion.

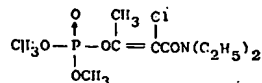
**Phosgene**. Carbonyl or chloroformyl chloride.  $COCl_2$ ; mol wt 98.92. C 12.14%, O 16.17%, CO 28.31%, Cl 71.69%. Prepn from chlorine + carbon monoxide: Whitehouse, U.S. pat. 1,231,226 (1917); Peacock, U.S. pat. 1,360,312 (1921); Bradner, U.S. pat. 1,457,493 (1923); Douthitt, U.S. pat. 2,847,470 (1958 to Texas Co.) from carbon monoxide + nitrosyl chloride: Williams, U.S. pat. 1,746,506 (1930 to Du Pont Ammonia Corp.); from carbon tetrachloride + oleum: Murphy, Reuter, *Australian Chem. Inst. J. & Proc.* 15, 144 (1948).

Colorless, highly toxic gas; suffocating odor; when much diluted with air there is an odor reminiscent of moldy hay; vapors strongly irritating to the eyes. Condenses at about 0° to a clear, colorless, fuming liquid.  $d_4^{20}$  1.432. mp –118°. bp<sub>760</sub> 8.2°. Vapor pressure at 20° = 1215 mm. Slightly sol in water and slowly hydrolyzed by it; freely sol in benzene, toluene, glacial acetic acid and most liq hydrocarbons. Lethal concn for rats in air: 50 ppm.

USE: For the prepn of many organic chemicals; as a war gas. *Human Toxicity*: Insidious poison as it is not irritating immediately, even when fatal concns are inhaled. May cause severe pulmonary edema (may be quickly fatal) or pneumonia. Inhalation of high concns causes choking, constricted feeling in chest, coughing, painful breathing, bloody sputum.

**Warning**: Paper soaked in alcoholic or carbon tetrachloride soln contg 10% of a mixture of equal parts of *p*-dimethylaminobenzaldehyde and colorless diphenylamine, then dried, will turn from yellow to deep orange in the presence of approx the max allowable concn of phosgene, and should always be used where the generation of this gas is possible or suspected.

**Phosphamidon**. Dimecron; 2-chloro-*N,N*-diethyl-3-hydroxycrotonamide dimethyl phosphate; 2-chloro-2-diethylcarbamoyl-1-methylvinyl dimethyl phosphate.  $C_{10}H_{19}ClNO_5P$ . Mol wt 299.70. C 40.07%, H 6.39%, Cl 11.83%, N 4.67%, O 26.69%, P 10.33%. May be prepd from trimethyl phosphite and *N,N*-diethyl-2-acetyl-2,2-dichloroacetamide: Anliker *et al.*, *Helv. Chim. Acta* 44, 1622 (1961).



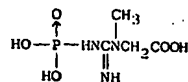
Oil.  $d_4^{25}$  = 1.2132.  $n_D^{25}$  = 1.4718. bp<sub>1.5</sub> 162°; bp<sub>0.0001</sub> 120°. Solidifying pt –45°. Absorption spectra: Anliker *et al.*, *loc. cit.* Miscible with water and organic solvents with the exception of saturated hydrocarbons. One gram dissolves in about 30 g hexane. LD<sub>50</sub> in rats: 16.8 mg/kg. USE: Systemic insecticide. *Human Toxicity*: Cholinesterase inhibitor. See Parathion.

**Phosphine**.  $PH_3$ ; mol wt 34.00. P 91.11%, H 8.89%. Formed in small quantity in the putrefaction of organic matter contg phosphorus. Prepd by boiling yellow phosphorus with an aq alkali hydroxide; also by the action of acids or water on metallic phosphides: Moser, Brukl, *Z. Anorg. Chem.* 121, 73 (1922); Klement in *G. Brauer's Handbuch der präparativen anorganischen Chemie* (Enke, Stuttgart, 1951), p 401. Convenient lab prepn from phosphonium iodide: Messinger, Engels, *Ber.* 21, 326 (1888), reprinted by Klement, *loc. cit.*

Gas. *Poisonous!* Odor of decaying fish; bp –87.7°. mp –133°. Spontaneously flammable in air if there is a trace of  $P_2H_4$  present; burns with a luminous flame. Slightly sol in water (0.26 vol at 20°). Combines violently with oxygen and the halogens. Liberates hydrogen and forms the phosphide when passed over a heated metal. Forms phosphonium salts when brought in contact with the halogen acids. Lethal concn for rats in air: 60 ppm.

*Human Toxicity*: Pain in region of diaphragm, a feeling of coldness. Weakness, vertigo, dyspnea, bronchitis, edema, lung damage, convulsions, coma, death.

**Phosphocreatine**. *N*-(Phosphonoamidino)sarcosine; creatine phosphate; creatinephosphoric acid; PC; Neoton.  $C_4H_9N_3O_5P$ ; mol wt 211.12. C 22.75%, H 4.77%, N 19.90%, O 37.89%, P 14.67%. The distribution of phosphocreatine (PC) in various tissues of a number of vertebrates has been determined; skeletal muscle contains much more than other tissues. Although PC is characteristic of the vertebrates, it also occurs in certain invertebrates. Isolat: from frog muscle, Eggleton, *Biochem. J.* 21, 190 (1927); from cat muscle, Fiske, Subbarow, *J. Biol. Chem.* 81, 629 (1929). Synthesis by phosphorylation of creatine: Zeile, Fawaz, *Z. Physiol. Chem.* 256, 193 (1938); Ennor, Stocken, *Biochem. J.* 43, 190 (1948). Review: Ennor, Morrison, *Physiol. Rev.* 38, 631 (1958).



Obtained as the sodium salt hexahydrate,  $C_4H_8N_3Na_2O_5P \cdot 6H_2O$ . Platelets from water + ethanol. Very sol in water. (Free acid, pK<sub>a2</sub> is 4.6.)

Calcium salt tetrahydrate,  $C_4H_8CaN_3O_5P \cdot 4H_2O$ . Hygroscopic crystals. Soluble in water; sparingly sol in alcohol. MED USE: Sodium salt to treat fatigue, Nordmann, U.S. pat. 3,114,674 (1963 to Compagnie Française des Matières Colorantes).

**Note**: The term *phosphagen*, originally a synonym for phosphocreatine, has since been used to describe any naturally occurring phosphorylated guanidine compd.

**Phosphomolybdic Acid**. *Molybdophosphoric acid*.  $20MoO_3 \cdot 2H_3PO_4 \cdot 48H_2O$ ; mol wt 3939.78. Mo 48.71%,  $H_2O$  21.95%,  $MoO_3$  73.08%, P 1.57%,  $P_2O_5$  3.60%,  $H_3PO_4$  4.98%. Anhydr salt 78.05%. For the anhydr: Mo 62.41%, O 35.38%, H 0.20%, P 2.01%.

Bright yellow crystals. Soluble in less than 0.4 part water; very sol in alcohol, ether.

USE: Weighting silks; as reagent for alkaloids, uric acid, xanthine, creatinine, some metals, with hematoxylin as nerve stain in microscopy.

**Phosphonium Iodide**.  $PH_4I$ ; mol wt 161.93. P 19.13%, H 2.49%, I 78.38%. Prepd by hydrolysis of a mixture of diphosphorus tetraiodide and white phosphorus according to the equations  $P_4 + 4I_2 \rightarrow 2P_2I_4$  and  $10P_2I_4 + 13P_4 + 128H_2O \rightarrow 40PH_4I + 32H_3PO_4$ : Work, *Inorg. Syn.* 2, 141 (1946). Improved apparatus for its prepn: Beredjick, *ibid.* 6, 91 (1960).

Consult the cross index before using this section

## **CLAIM APPENDIX**

2. A hydrogen composition comprising: hydrogen; and an odorant, said odorant having a vapor pressure greater than 0.5 psi, having a smell detectable at less than 1 ppm by a human nose, and being in a vapor phase at detectable concentration at a pressure of 6000 psi, wherein said odorant is a selenium compound
3. The composition of claim 2, wherein said selenium compound is ethylselenol.
4. The composition of claim 2, wherein said selenium compound is dimethyl selenide.
7. The composition of claim 2, wherein said gaseous composition consists essentially of hydrogen gas and said odorant.
8. The composition of claim 2, wherein said odorant comprises 0.01 to 1000 ppm of said composition.
9. The composition of claim 2, wherein said odorant comprises 0.1 to 40 ppm of said composition.
10. The composition of claim 2, wherein said odorant is not harmful to humans.
11. The composition of claim 7, wherein said odorant has a minimum olfactory power of 7.0, a minimum vapor pressure of 0.5 psi at standard temperature and pressure, a minimum diffusivity of  $0.01147 \text{ cm}^2/\text{s}$ , and a maximum molecular weight of 200 g/mol.
45. A fuel cell containing the composition of claim 2.
46. The fuel cell of claim 45, wherein said fuel cell is a vehicle fuel cell.
47. The composition of claim 2, wherein said selenium compound is

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methylselenol.

48. The composition of claim 2, wherein said selenium compound is isopropylselenol.

49. The composition of claim 2, wherein said selenium compound is propylselenol.

50. The composition of claim 2, wherein said selenium compound is ethylmethylselenide.

51. The composition of claim 2, wherein said selenium compound is isopropylmethylselenide.

52. The composition of claim 2, wherein said selenium compound is tertbutylselenol.

53. The composition of claim 2, wherein said selenium compound is diethylselenide.

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**EVIDENCE APPENDIX**

There is no evidence of record other than the references cited by the Examiner during the prosecution of the present application.

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**RELATED PROCEEDINGS APPENDIX**

There have been no decisions rendered by a court or the Board in any proceedings related to this appeal.